Two New Combinations in *Triantha* (Liliaceae)

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ABSTRACT. Two new combinations at the subspecies level are proposed for *Triantha occidentalis* (S. Watson) Gates. A brief explanation is provided to account for their being made under this species name and not the presently more widely recognized *Tofieldia occidentalis* S. Watson.

In preparing the treatment of *Tofieldia* for the *Flora of North America* (FNA), I became aware that it is a rather heterogeneous assemblage, represented by two disparate sets of species. One is a homogeneous group of three species, *Tofieldia glutinosa* (Michaux) Persoon, *T. occidentalis* S. Watson, and *T. racemosa* (Walter) Britton, Sterns & Poggenberg, characterized by glandular pubescence, appendaged seeds, and clustered flowers. The other, consisting of *T. coccinea* Richardson, *T. glabra* Nuttall, and *T. pusilla* (Michaux) Persoon, is a much less homogeneous group whose members are glabrous, with appendageless seeds and flowers arising singly. In two of only three previous studies that include all the known North American species of *Tofieldia* (Baker, 1879; Gates, 1918), the former group of species was treated as a distinct genus, *Triantha*, based on a section of *Tofieldia* recognized by Nuttall (1818). Despite this, authors have consistently disregarded *Triantha*, the only significant exception being Small (1903).

In the broader context of the tribe Tofieldieae, a study by Ambrose (1980) showed that the monotypic *Pleea* (transferred by Utech (1978) to *Tofieldia*) was best treated as a separate genus, and Cruden (1991) came to a similar conclusion with respect to *Isidrogalvia*, traditionally included in *Tofieldia*. Both studies provided evidence that *Triantha* is distinct from *Tofieldia*. Clearly, systematic consistency would best be served if *Tofieldia* and *Triantha* were treated as separate genera following Baker (1879) and Gates (1918). R. Kiger (FNA taxon editor for Liliaceae) and F. Utech (FNA advisor on Liliaceae) have concurred.

In the following consideration of the necessity for the new combinations, for expository ease, the context of the discussion is that of the original genus *Tofieldia*. Hitchcock (1944), in his study of variation in *Tofieldia glutinosa* (= *Triantha glutinosa* (Michaux) Baker) and *Tofieldia occidentalis* (= *Triantha occidentalis* (S. Watson) Gates), identified, on the basis of morphological characters, "five fairly well marked . . . closely related entities . . . each of which has a rather well defined geographic range." He discussed the various ways in which they might be treated taxonomically, suggesting three possibilities:

1. Recognize all the entities as species;
2. Recognize two species, *Tofieldia glutinosa* and *Tofieldia occidentalis*, the former comprising two subspecies, the latter three;
3. Assign the five entities the rank of subspecies under a single species.

Hitchcock chose the third alternative and treated the five entities as subspecies of *Tofieldia glutinosa: occidentalis*, *brevistyla*, *absona*, *montana*, and *typica* (*glutinosa*). In discussing his second possibility, Hitchcock suggested that *montana* would be treated as a subspecies of *T. glutinosa*, while *brevistyla* and *absona* (which he said was only a local variant of *brevistyla*) would be treated under *T. occidentalis*.

In preparing the account of *Tofieldia* I examined most of the material that Hitchcock worked with as well as a considerable amount of additional material collected over the past 50 years, particularly from western Canada and Alaska. The investigation has confirmed Hitchcock's findings. The only minor exception is his *absona* (restricted to the Priest Lake area of Idaho), which is in my view not significantly different from *brevistyla* and is included with it. However, as a somewhat better understanding of the morphology of Hitchcock's subspecies emerged, it became apparent that the best taxonomic treatment was not the one that he finally selected but his second alternative, the recognition of two species, *Tofieldia glutinosa* and *T. occidentalis*, but with the difference that *montana* be treated as a subspecies of *T. occidentalis* along with *brevistyla* (including *absona*) and not as a subspecies of *T. glutinosa*.

When Watson (1879) described *Tofieldia occidentalis* he mentioned the occurrence of a "loose white spongy testa" surrounding the mature seeds, which is absent in *T. glutinosa*. The precise nature of this spongy or inflated enveloping tissue is not

certain—it may or may not be testa—but it instantly distinguishes *T. occidentalis* from *T. glutinosa* (and from the other trianthoid species, *T. racemosa* and *T. japonica*). The seeds of subspecies *brevistyla* and *montana* have the spongy covering, those of the former being identical to *T. occidentalis* in that the covering is strongly inflated, while in *montana* it is less strongly inflated.

Hitchcock appreciated the significance of this unique seed characteristic, making reference to it in discussing his second taxonomic scheme, when proposing that *brevistyla* and *absona* might be treated under *Tofieldia occidentalis*. It is consequently not clear why he should have been inclined to refer *montana* to *T. glutinosa*, especially since he remarked that the inflated testa of this subspecies is "a characteristic unlike *glutinosa*, but like *occidentalis*." He mentioned that the flowers of *T. glutinosa* and *montana* are similar, but the flowers in all the subspecies he distinguished are generally alike, and while they show some slight variation they are not of much significance in the recognition of infraspecific taxa.

Further to this, *montana* has, as Hitchcock observed, "much longer pubescence than is to be found in any other of the subspecies," and he said there is "no difficulty in distinguishing it from *glutinosa typica*." Although he did not mention it, the long cylindrical hairs below the inflorescence in *montana* occur to the complete exclusion of the dome-shaped or conical glands (Hitchcock's "haycocks") that are found to a greater or lesser extent in the other subspecies, and which in *T. glutinosa* are virtually the only vestiture on the stem. The more or less cylindrical hairs of various lengths, but longest in *montana*, are a characteristic of *T. occidentalis* and not of *T. glutinosa*. Watson (1879) had an insight into this difference when he described the pubescence of *T. occidentalis* as "viscid" and that of *T. glutinosa* as "glutinous."

Another character that Watson mentioned in distinguishing *Tofieldia occidentalis* from *T. glutinosa* is the division of the bracteoles, which he described as being "3-lobed nearly to the middle" in the former, and "scarcely lobed" in the latter. The variation in the lobing of the bracteoles in *T. occidentalis* is actually somewhat greater than originally indicated by Watson, and bracteoles of *T. glutinosa* may occasionally be deeply divided, but the difference Watson noted is valid and applies as well to the subspecies that Hitchcock described. It has also been observed in the present study that the bracteoles in *T. occidentalis* are often glandular, but glandular bracteoles are virtually unknown in *T. glutinosa*.

In light of the above it is concluded that the best taxonomic treatment of the variation that Hitchcock documented is essentially his second alternative: that is, to recognize *Tofieldia occidentalis* and *T. glutinosa* as distinct species with *brevistyla* (including *absona*) and *montana* treated as components of *Tofieldia occidentalis*.

This requires the following nomenclatural revisions.

Triantha occidentalis (S. Watson) Gates subsp. **brevistyla** (Hitchcock) Packer, comb. nov. Basionym: *Tofieldia glutinosa* (Michaux) Persoon subsp. *brevistyla* Hitchcock, Amer. Midl. Naturalist 31: 495. 1944. TYPE: Canada. British Columbia: 32 mi. N of Golden, 11 July 1944, *Hitchcock & Martin 7638* (holotype, WTU).

Triantha occidentalis (S. Watson) Gates subsp. **montana** (Hitchcock) Packer, comb. nov. Basionym: *Tofieldia glutinosa* (Michaux) Persoon subsp. *montana* Hitchcock, Amer. Midl. Naturalist 31: 496. 1944. TYPE: U.S.A. Montana: Glacier National Park, Logan Pass, 18 Sep. 1937, *Barkley & Marsh 1731* (holotype, WTU).

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